

## DEVICE AND METHOD FOR MEASURING IN BODY CAVITIES

### Background of the invention

5 The invention relates to the examination and measurement of passages and cavities in the human or animal body, and in particular of irregularities such as constrictions by means of a device comprising an electrical signal source, a catheter to be introduced into a cavity through a natural or surgically prepared opening in the body, a first transducer for transmitting an acoustic activation signal from the signal source to and through the catheter, a second  
10 transducer for reception of response signals from the catheter, and a computer for analysing the response signals in relation to the activation signal.

Various methods are known for the examination and measurement of occlusions, deformations, movements etc. in various human and animal cavities, e.g. airways such as the pharynx and the larynx, the gastro-intestinal tract, the urinary system, blood vessels etc.  
15

US 5 823 965 discloses an apparatus and method for examining human or animal body cavities such as airways and the gastro-intestinal tract. The device has a flexible hose-like catheter, which is introduced into the cavity with the distal end of the catheter beyond the zone to be examined. An acoustical excitation signal is sent into the interior of the catheter. Irregularities reflect the acoustical signal, which is picked up by a receiving transducer and analysed. Such method is often referred to as reflectometric examination. A  
20 computer displays results of the examination on a screen. The device may comprise means for establishing a positive static pressure with the purpose of dilating the flexible wall of the measuring zone.

30 The purpose of the invention is to provide improvement in the measuring capability in such known devices.

**CLAIMS**

1. A device for examining human and animal body cavities, the device comprising

5

- a catheter (1) with a proximal end (A) and a closed distal end (B) for inserting into the human or animal body cavity, the catheter having a lumen extending from the proximal end into the catheter,

10 - a signal generator (2) for generating an excitation signal,

- a transmitting transducer (3) coupled to receive the excitation signal and arranged to transmit, in response to the excitation signal, a corresponding acoustic signal into the lumen of the catheter,

15

- a receiving transducer (5) arranged to receive reflections of the acoustic signal from the lumen of the catheter,

- a pressure transducer (42) sensitive to low frequencies and arranged to sense, when inserted into the body cavity, the pressure in the lumen of the catheter and outputting a signal representing low-frequency pressure variations, and

20

- a signal processing device (4, 6) for receiving and analysing the output signals from the receiving transducer (5) and the pressure transducer (42).

25

2. A device according to claim 1 wherein the excitation signal comprises an impulse signal of duration short enough to make the corresponding reflected signal distinguishable from the excitation signal.

30

REPLACED BY  
ART 31(1)(b)

3. A device according to claim 1, where the pressure transducer (42) is sensitive to frequencies up to at least 10 Hz, preferably up to at least 100 Hz.

4. A method for obtaining dynamic data of the conditions in a human or animal body cavity, the method comprising

- transmitting an acoustic impulse signal into the body cavity,

- receiving reflections of the acoustic impulse signal from the body cavity,

- obtaining data of low frequency pressure changes in the body cavity, and

- analysing the received reflections and the data of low frequency pressure changes to obtain information on the body cavity.

5. A method according to claim 4 comprising transmitting the data obtained to a signal processing device for simultaneous processing.

6. A method according to claim 4, wherein the analysis of the received reflections and of the data of low frequency pressure changes are used to provide corresponding area and pressure representations.